

# Notice of Allowability

Application No.

10/016,661

Examiner

Kibrom K. Gebresilassie

Applicant(s)

BALANIUK ET AL.

Art Unit

2128

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to After final amendment filed on 11/19/2007.

2. ☒ The allowed claim(s) is/are 1, 3, 5-12 and 21-24.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some\* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.

(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_

4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other \_\_\_\_\_

### **DETAILED ACTION**

1. This communication responsive to amended application filed on 04/27/2007.
2. Claims 1-3, 5-12, and 21-24 are presented for examination.
3. Examiner would like to thank applicants to carefully analyze the Office Action, and make appropriate amendments and therefore the rejections under 35 USC 112, second paragraph, and 35 USC 101 are withdrawn.

### **EXAMINER'S AMENDMENT**

4. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
5. Authorization for this examiner's amendment was given in a telephone interview with Mr. Thomas J. McFarlane, Reg. No. 39,299, on December 7, 2007.
  - a. Claim 1, line 2, after "medium," insert the phrase --wherein said deformable medium represents soft tissue,--.
  - b. Claim 1, line 6, delete the word -- substantially --.
  - c. Delete claim 2.
  - d. Claim 8, line 1, delete the word -- means for --.
  - e. Claim 10, line 2, after "object," insert the phrase --wherein said deformable medium represents soft tissue,--.
  - f. Claim 21, line 2, after "medium," insert the phrase --wherein said deformable medium represents soft tissue,--.

***Allowable Subject Matter***

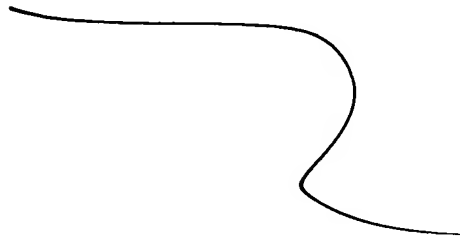
6. Claims 1, 3, 5-12, and 21-24 are allowed.
7. The following is an examiner's statement of reasons for allowance:

The following portions of the specification are critical to determining a broad, reasonable interpretation of the claim language, but are not to be interpreted as claim limitation.

Specification pages 8 and 9:

Yet another object of the present invention to provide systems, methods, and apparatuses relating to defining an original and efficient three-dimensional (3D) meshing strategy based on the inventive long elements, the novel meshing strategy permitting approximation of state of and strain at any point on a volume with a reduced number of explicitly updated points, wherein number of elements per a meshed model is proportional to square length of a side of the model rather than its cube, thereby requiring substantially less computational power and resources than cubes or tetrahedral based meshing strategies.

Page 25:



The LE is now modeled as a spring attached to a particle with a known mass. As shown in Fig. 8, A combination of two LEs attached to the same particle is used as the basic element to mesh the volumes. The LE is an one-dimension entity, defined by its length  $L$ . The particle attached to it is defined by a mass  $m$  and a state in an one-dimensional space as well. A deformed LE creates a force that is applied to the particle accelerating it. The mass of the particle corresponds to the mass of the material inside the LEs connected to it.

It is well known that to simulate deformable objects using different meshing strategies such as cubic or tetrahedral, as shown by the prior arts of record, however, there is no teaching in the prior art to use a meshing strategy based on "long elements" as claimed invention.

None of these references taken either alone or in combination with another discloses the limitation of:

As per claim 1:

configuring said computer with a meshing strategy based on said plurality of long elements wherein number of said plurality of long elements is proportional to  $b^2$  where  $b$  is length of a side of said deformable medium thereby substantially reducing number of time steps required by said modeling; and

As per claim 10:

discretising volume of said deformable object with a plurality of long elements wherein number of said plurality of long elements is proportional to  $b^2$  where  $b$  is length of a side of said deformable object;

As per claim 21:

meshing said deformable medium based on said plurality of long elements wherein number of said plurality of long elements is proportional to  $b^2$  where  $b$  is length of a side of said deformable medium; and

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kibrom K. Gebresilassie whose telephone number is 571-272-8571. The examiner can normally be reached on 8:00 am - 4:30 pm Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on 571-272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2128

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KG

2008 JUN 10 10:00 AM  
KUCH KONES P.D.  
PRIMARY PATENT EXAMINER  
TECHNOLOGY CENTER 2100